The Impact of the Time Interval from Attending an Officer Development Course to the Time of Promotion to Company Officer on the Level of Knowledge Retention

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that proper credit is given where I have used the language, ideas, expressions, or writings of others.

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Abstract

The problem is that many members of the City of Durham Fire Department who have completed the Officer Development course do so as firefighters in their first two years of service. The assumption is that the amount of time which passes between the course completion date and the promotion to an officer position is too great; resulting in reduced performance levels and increased risk of personnel injury.

The purpose of this research is to determine what role the interval between completion of an officer development course and promotion of the firefighter to a company officer's position, has in applying the learned materials from the officer development course.

The author used the descriptive research method to answer the following research questions:

1.   What is the correlation between when the officer development class was taken and how much of the presented information was retained at the time of promotion?

2.   How do similar departments address the timing issue?

3.   What knowledge retention/evaluation mechanisms exist for adult education that could be adopted/utilized by the fire service?

4.   How have organizations outside of the fire service addressed the timing issue of management training?

A comprehensive literature review was conducted. Internal and external questionnaires were developed and distributed to fire department personnel in multiple departments. Personal interviews and web-based searches were conducted for non-fire service related information.

Results of the research show that when a significant time interval passes from the time of training to the time the training is applied, there is a loss in the level of knowledge retention.

Recommendations made were made to attempt to reduce the time interval between training and application by establishing a time in-service requirement and development of a refresher course that is attended immediately after promotion to company officer.

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Introduction

Much has been written on the importance of professional development planning for fire service personnel desiring to become a fire service officer. Professional development planning consists of four elements: formal education, training, experience, and self-development (International Association of Fire Chiefs [IAFC], 2004, p 4). A sub-element of both the formal education and training elements is an officer development program. The research topic for this project was the effect that the length of time from class attendance to promotion has on an officer's ability to recall the information presented during an officer development course.

The problem is that many members of the City of Durham (NC) Fire Department (DFD) who have completed the Officer Development Program do so as firefighters in their first two years of service. The assumption is that the amount of time which passes between the course completion date and the promotion to an officer position is too great; resulting in reduced performance levels and increased risk of personnel injury.

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The author used the descriptive research method to answer the following research questions:

1. What is the correlation between when the officer development class was taken and how much of the presented information was retained at the time of promotion?

2. How do similar departments address this timing issue?

3. What knowledge retention/evaluation mechanisms exist for adult education that could be adopted/utilized by the fire service?

4. How have organizations outside of the fire service addressed this timing issue of

management training?

Background and Significance

The City of Durham Fire Department provides services to over 218,000 citizens within a

100 square mile service area. The Department operates on an annual budget in excess of $20.1

million. The Department provides fire, EMS, and rescue services with 300 personnel working

within four divisions – Suppression, Training, Fire Prevention, and Administration Services.

In addition to fire protection, the Department provides emergency medical services at the

Emergency Medical Technician – Intermediate level, which in North Carolina is one level below

the Paramedic level. The Department also operates various specialty teams, including two

hazardous materials units, one technical rescue unit, one water response unit, one urban search

and rescue (USAR) unit (water capable). The Department is a partner agency with three other

local municipal departments which respond together as a regional USAR task force.

The City of Durham Fire Department began offering an Officer Development Program in

1991 to help company officers and others who aspired to become a company officer have a better

understanding of some of the essential requirements of the position (strategies, tactics, training,

administrative issues). In 1996 the Officer Development Program became a promotional

requirement for the rank of Fire Captain.

Members of DFD are eligible to apply for the Officer Development Course as soon as

they are off of their probationary status (six months of service). Members of the City of Durham

Fire Department must have a total of eight years of service (four years at the rank of Firefighter

and four years at the rank of Fire Technician) to meet the minimum years of service requirement

for promotion to Captain (DFD, 2008).

The current impact of this research problem is that due to this time lapse between the completion of the officer development course and promotion to Captain, many newly promoted Captains are reporting for duty lacking the knowledge necessary to perform essential, non-emergency tasks such as company level training, coaching and mentoring plans, and report writing.   The department does not offer refresher training for those members who have completed the Officer Development Course.

This applied research project was completed as a requirement of the Executive Fire Officers Program (EFOP). The need to determine what affect the time lapse from completing the City of Durham Fire Department's Officer Development Program to promotion to Company Officer has is in line with the objectives and goals of the *Executive Development (R123)* course (Department of Homeland Security [DHS] 2006 p. SM 0-3) as well as all four of the United States Fire Administration operational objectives (DHS 2009 p. II-2).

Literature Review

The literature review was based on the four research questions. The first question asked "What is the correlation between when the officer development class was taken and how much of the presented information was retained at the time of promotion?" In order to better understand the relationship of how much information is retained during the time following completion of an officer development course, the author concentrated this segment of the literature review in training and development, educational psychology, and organizational behavior.

Custers reviewed twenty research studies from various health-sciences related domains on the impact of the retention interval (RI) using medical and dental students as the participants (Custers, 2008). Custers stated that "the decay of knowledge always implies a period of nonuse

– the retention interval- and it is obviously most salient and problematic in situations where individuals learn something that they may not be required to retrieve or use for an extended period of time" (Custers, 2008, p. 111).   Results of Custers review suggest that approximately two-thirds to three-fourths of knowledge will be retained after one year, with a further decrease of slightly below fifty percent in the next year (Custers, 2008, p.123).   Pike wrote that over a period of three days, the amount of learning that is retained is as follows:

- 10% of what is read

- 20% of what is heard

- 30% of what is seen

- 50% of what is seen and heard

- 70% of what is said

- 90% of what is said and done (e.g., orally working out a problem)(Pike, 1989)

The amount of information retained is directly related to the level of transfer of learning that occurred during the officer development course. Leib defines the transfer of learning as "the result of training- it is the ability to use the information taught in the course but in a new setting" (Leib, 1991, p. 3). Muchinsky stated that "a factor that can influence the transfer of learning is the extent to which the post training environment provides opportunities for trainees to apply what they have learned" (Muchinsky, 2003, p. 202). Chowdhury wrote that learning in the context of training is well connected with the post learning application, otherwise known as the transfer of learning (Chowdhury, 2006).

Muchinsky wrote that the effectiveness of a training program can be influenced by events that occur after a trainee returns to the job (Muchinsky, 2003, p. 202). Egsegian concluded that

the learning activities must provide the officer development student opportunities to practice, review, and apply this newly gained knowledge in a timely manner (Egsegian, 2001).

It is important for adult students to understand the applicability of the information being learned. If the adult student does not understand why the information is important, they will most likely retain little beyond the immediate learning event (Blanton, 1998). In addition to knowing how the information is going to be applied, Tyler (2000) states that a common mistake made by employers is providing an employee with training too far in advance of their need for the training. The goal, according to Tyler (2000) is to schedule training as close to the time they need it as possible.

The second research question asked "How do similar departments address the timing issue?" The Charlotte (NC) Fire Department has a tiered officer development program that requires an employee with the desire to seek promotion to officer complete eight core courses through either the community college or university level and then apply for the officer candidate school. The eight core courses may be taken at any time during the firefighters career (J. Richardson, personal conversation, April 14, 2010). Additional requirements for the officer candidate school are that the employee must be a Firefighter II or an Engineer. The minimum time in-service requirement for promotion to Captain is five years (Charlotte Fire Department, 2009). Once the firefighter is accepted into the officer candidate course, the firefighter completes a series of training sessions spread over a period of one year that meet the NFPA standards for Fire Officer I Fire, Officer II, and Fire Service Instructor I (Charlotte Fire Department, 2009).

The Town of Cary (NC) Fire Department requirements for promotion to officer are similar to Charlottes. The earliest a member of the Cary Fire Department would be eligible for

promotion to an officer's position is six years. Additional requirements are that the member

must have a minimum of 12 hours of supervisor training during the year prior to applying for

promotion and that they must have completed the North Carolina Fire and Rescue Commission

Fire Officer I course (Cary Fire Department, 2009).

The High Point (NC) Fire Department has a training and certification matrix for officer

development. In order for a High Point firefighter to be eligible for promotion to captain, they

must have been on the department a minimum of ten years and have completed the equivalent of

an Associates of Applied Science degree. Once promoted, the Captain attends a short one week

refresher course that covers report writing, strategies/tactics, and departmental policies (D.

Cline, personal communication, April 27th, 2010).

The Richmond (VA) Fire Department has a two week Officer Course that all newly

promoted officers complete immediately after they are selected for promotion. This course

covers the topics of human resource issues, strategies and tactics, and departmental policies and

procedures appropriate for the Lieutenant position (personal conversation, B. Dalrymple, April

20th, 2010).

Edwards (2000) wrote that during his service with the Prince George's County Fire

Department, personnel were permitted to attend the Officer Candidate School only after they had

scored high enough on the department's promotional process written exam (Edwards p. 113).

Fire departments in the city of Raleigh (NC) and Chapel Hill (NC) were the only two

departments contacted that do not have an established officer development course. Raleigh has

numerous time in-grade requirements for various ranks and is considering adoption of an officer

development program (J. Fanning, personal communication, March 24th, 2010). The Chapel Hill

Fire Department requires a minimum of four years of service as a fire fighter, knowledge and

level of competency usually associated with the completion of one year of college courses of study related to the occupational field, and the ability to meet current requirements for certification for NC Fire and Rescue Commission Fire Officer I (R. Bosworth, personal communication April 27th, 2010).

Grant and Hoover (1994) wrote that adequate fire officer training programs build effectiveness and efficiency of operations (Grant & Hoover, 1994 p. 112). In order for an officer development program to be considered adequate, the course and the students should be evaluated. The third research question asked "What knowledge retention/evaluation mechanisms exist for adult education that could be adopted and or utilized by the fire service?"

Morrison, Ross, and Kemp discuss three categories of program evaluation- formative, summative, and confirmative (Morrison, Ross, and Kemp, 2001). Formative evaluations are designed to provide feedback to the instructional designer regarding improvements to the training program during the development process. Summative evaluations assist in determining a program's effectiveness immediately following the end of the training program. Morrison, Ross, and Kemp measure the following during a summative evaluation:

- Effectiveness of learner or trainee learning

- Efficiency of learner or trainee learning

- Long-term benefits of the instructional Program (Morrison, Ross, and Kemp, 2001, p. 276)

The third category of evaluation is confirmative evaluation. Confirmative evaluations determine a program's effectiveness over a period of time such as six, nine, or twelve months from the conclusion of the training program (Morrison, Ross, and Kemp, 2001).

Donald Kirkpatrick developed a model for evaluating training programs in 1959. This model is often times referred to as the *Kirkpatrick Model*. Kirkpatrick himself refers to the model as the *Four Levels* (Kirkpatrick, 1998, p. xvi). Kirkpatrick wrote that the *Four Levels* offer a sequence of ways for an organization to evaluate a program. The *Four Levels* of training program evaluation are: Reaction, Learning, Behavioral, and Results (Kirkpatrick, 1998, p. 19). The Results level is applicable to this research due to Kirkpatrick's definition of results being the final results that occurred because the participant attended the program (Kirkpatrick, 1998, p. 23).

According to Cervero, program evaluation is a basic function of the education provider unit, in this case the City of Durham Fire Department, to assess its success or failure in meeting the objective of training future officers (Cervero, 1988).   Cervero goes on to say that "in most cases, continuing educators administer end-of-program questionnaires to participants and obtain useful information for planning future programs" (Cervero, 1988, p. 132).

The author conducted personal interviews with representatives from Bank of America, BAE Systems Inc., and the US Army to answer research question 4: "How have organizations outside of the fire service addressed the timing issue of management training?"

Bank of America (BoA) Systems Engineering Consultant Brian Fadden stated that the majority of the managers that he is familiar with were hired as management trainees with a four year degree and attended BoA management training immediately after being hired. Fadden went on to say that "management training is an ongoing process on a yearly basis via different channels such as web training, classroom, and job aides" (B. Fadden, personal communication, May 2nd, 2010). Fadden also added that people that are able to apply items that are fresh in their

memory from training often are more successful in retaining the information and able to reach others (B. Fadden, personal communication, May 2nd, 2010).

When asked how BAE Systems Inc. conducts entry level management training, Precision Targeting Systems Chief Engineer Tim Mancillas stated "Our work group assigns members to leadership roles on a rotational basis during the life of a particular project. This rotation allows junior engineers to begin learning the critical tasks required of them as they progress through the various management levels". Mancillas went on to say that this method also exposes the employee to position specific requirements and allows them to determine for themselves whether or not they want to pursue advancement (T. Mancillas, personal communication, May 2nd, 2010).

Master Sergeant Trevor Hanlon of the North Carolina Army National Guard stated that the Army separates its management and leadership training into two categories, enlisted soldiers and commissioned officers. Officer candidates obtain training during their college courses and during Officer Candidate School. Once the candidates complete their training, they are commissioned as Second lieutenants and report to an assignment. The enlisted soldiers begin leadership/management training as their ranks and responsibilities require. Hanlon provided an example of the Army leadership levels by saying "a soldier would not attend the NCO Course until that soldier has been promoted to the rank of E-4 but will have had some basic leadership training leading up to the promotion" (T. Hanlon, personal communication 5 April, 2010).

US Army regulation 600-100, *Army Leadership*, provides details for the Army's leadership levels. The three leadership levels are direct, organizational, and strategic. The direct level of leadership is defined as "frontline leadership and includes leaders from the squad through battalion tactical units" (Army, p.3).

The Literature Review influenced this research project by supporting the authors'

argument that the time interval from attending training to the time the person is able to apply the

material does have an impact on the level of knowledge retention. The lower level of knowledge

retention could result in reduced effectiveness and an increase in risk of injury to personnel.

Procedures

The purpose of this research was to determine what role the time interval from officer

development course completion to promotion to Captain has in applying learned materials. The

literature review began on the campus of the National Fire Academy by utilizing the LRC as well

as a preliminary internet search using Google and Ask.com search engines. Further literature

review was conducted at the following libraries: Undergraduate library on the campus of The

University of North Carolina at Chapel Hill and the north campus library at Durham Technical

Community College.

The author utilized three web-based databases to locate many non-fire service related

sources. The data bases used were ERIC.ed.gov (education resources information center),

NETLIBRARY.com, and NClive.com.

Internal and external questionnaires were designed using the web-based tool Survey

Monkey. The internal questionnaire link was sent to the members of the City of Durham Fire

Department via the department's all user email system.

The internal questionnaire (Appendix A) was designed to provide data for research

question one: What is the correlation between when the officer development class was taken and

how much of the presented information was retained at the time of promotion?

The internet link for the external questionnaire (Appendix B) was sent to the National

Society of Executive Fire Officers and distributed to that organizations membership as well as to

the City of Raleigh, Town of Cary, and Town of Chapel Hill Fire Departments for distribution to their personnel.

In addition to the external questionnaire, the author also contacted members of several departments directly and conducted phone interviews. Appendix C contains a list of respondents to the external questionnaire and personal interviews. The personal interview questions are in Appendix D. The author also conducted internet based searches for these departments to identify any information that they may have made available.

Personal interviews were designed and conducted to answer both the third research question "What knowledge retention/evaluation mechanisms exist for adult education that could be adopted or utilized by the fire service?" and the last research question "How have organizations outside of the fire service addressed the timing issue of management training?" The personal interview questions are located in Appendix D.

The author identified two possible limitations for this research project. The six month time frame was adequate for basic research, however, in order to gain more data specifically related to the retention interval, the author estimates a needed research time of approximately twelve months from the completion of an officer development program. The second limitation of concern to the author was the limited number of internal questionnaire responses.

Results

The internal questionnaire (Appendix A) was sent to the 300 members of the City of Durham Fire Department via the internal email system. The internal questionnaire was used to answer the first research question "What is the correlation between when the officer development program was taken and how much of the presented information was retained at the time of promotion?" Seventy-nine members of the department completed the internal

questionnaire for a 29% response rate.   Twenty-nine Captains (37%), twenty-six Fire

Technicians (33.3%) , thirteen firefighters (16.7%), six Battalion Chiefs (7.7%), three Assistant

Chiefs (3.8%) and the Fire Chief completed the internal questionnaire.

Question two of the internal questionnaire asked if the member had completed the Officer

Development course. Fifty-eight of the respondents (73%) indicated that they completed the

departments' officer development course. None of the respondents skipped this question.

Question three asked "what rank did you hold when you took the officer development

course?" Twenty-six respondents (32.9%) indicated that they held the rank of Firefighter,

twenty-five were Fire Technicians (31.6%), six were Captains (7.6%) and one was a Battalion

Chief. Twenty-one of the respondents (26.6%) have not taken the officer development course.

None of the respondents skipped this question.

Question four asked the members to indicate how many years of service they had when

they completed the officer development program. Twenty-seven of the respondents(34.6%)

indicated that they had more than six years of service when they completed the officer

development course. Both the categories for 5-6 years and 3-4 years of service had nine

respondents(11.5%). The category for 2-3 years of service had eight of the total

responses(10.3%). Four respondents(5.2%) indicated that they completed the officer

development course having only 1-2 years of service. Twenty-one of the respondents(26.9%)

indicated that they had not yet completed the officer development course. One respondent

skipped this question.

When asked how many years of service the member had when they were promoted to

Captain, thirty-seven respondents (48.1%) indicated that they had not yet been promoted.

Eighteen (23.4%) had more than ten years of service. Six (7.8%) had 9-10 years and nine

(11.7%) had 8-9 years of service. One respondent indicated that they had been promoted with 7-8 years of service. The category for 6-7 years had two respondents (2.6%) and four respondents (5.2%) had 5-6 years of service. Two of the respondents skipped this question.

Question six asked the respondent to indicate their level of agreement with the statement that the officer development course adequately prepared them for the position of Captain. Thirty (38.5%) indicated that they had not been promoted to Captain. Two members (2.6%) strongly agreed while ten (12.8%) strongly disagreed with the statement. Fifteen (19.2%) indicated that they somewhat agreed and fifteen (19.5 %) somewhat disagreed. Six of the respondents (7.7%) agreed with the statement that the officer development course adequately prepared them for the position of Captain. One respondent skipped this question.

Question seven asked the respondent to indicate their level of agreement with the statement that "the time period between completing the officer development course to the time of promotion to Captain was significant enough that I have forgotten, or otherwise am not readily familiar with, the knowledge and/or concepts that were delivered." Seventy-six respondents completed this question while three skipped it. Thirty-seven respondents (48.7%) indicated that they had not been promoted to captain. Three (3.9%) strongly agreed while five (6.6%) strongly disagreed with this statement. Eight of the respondents (10.5%) somewhat agreed and sixteen (21.1%) somewhat disagreed. Seven (9.2%) agreed with the statement.

The final question on the internal questionnaire asked if the respondent was given a post-course evaluation. Fifty-one of the respondents (70.8%) indicated that they had not been given a post-course evaluation. Question eight had a total of seventy-two respondents that answered the question and seven respondents did not provide an answer.

Research question two asked "How do similar departments address the timing issue?" The external questionnaire (Appendix B) was sent to all of the municipal fire departments in adjacent counties to the authors' and to the Society of Executive Fire Officers. Appendix C lists the departments that were contacted by the author as well as those responding via the link sent to the Society of Executive Fire Officers.

There were 126 responses to the external questionnaire. Question one of the external questionnaire asked if the respondents department offered an officer development program. Seventy-six respondents (60.3%) indicated that their department does offer some form of an officer development program. The fifty respondents who answered "no" to question one were directed to go to question nine.

Question two asked the respondents if the officer development program that their department offered was required for promotion to an officer's position. Forty-one respondents (49.4%) indicated that their program was required for promotion. Forty-three respondents skipped this question.   According to J. Richardson, completion of the officer candidate school is required before a member is permitted to apply for promotion to Captain in the Charlotte Fire Department (J. Richardson, personal communication, April 14th, 2010).

Question three asked the respondents if they had completed the officer development program. Fifty-three of the respondents (63.9%) have completed the program offered by their department. Forty-three respondents skipped this question.

Question four asked the respondents to indicate the rank they held when they completed the officer development program. One respondent (1.3%) indicated that they were the Chief of the Department and one indicated that they held the rank of Deputy Chief. Two respondents (2.5%) indicated that they were an Assistant Chief and three (3.8%) were Battalion Chiefs.

Nineteen respondents (24.1%) indicated they attended as a company officer and another nineteen

(24.1%) indicated that they completed the course as a Driver, Operator, Engineer, or Fire

Technician. Seven respondents (8.9%) completed an officer development course as Firefighters.

Twenty-seven (34.2%) of those who answered question four indicated that they had not attended

an officer development course. Forty-seven respondents skipped this question.

When asked what the difference in time from completing the officer development

program to the time of promotion was, twenty respondents (25.3%) indicated less than one year.

Nineteen respondents (24.1%) had 1-2years and ten (12.7%) had 2-3 years. The categories of 5-

6 years and greater than six years had one respondent each. Twenty-eight of the respondents

(35.4%) had not attended an officer development program. Forty-seven respondents skipped this

question.

Question six, a follow-up to question five asked the respondents to indicate their level of

agreement with the question "do you feel that this time difference had a negative impact on your

ability to retain and implement the knowledge and skills obtained from the class?" Four (5.1%)

respondents strongly agreed and nineteen (24.1%) strongly disagreed. Nine respondents (11.4%)

somewhat agreed and seventeen (21.5%) somewhat disagreed. Three respondents (3.8%)

indicated that they agreed with the statement.   Twenty-seven respondents (34.2%) have not

taken a course. Forty-seven respondents skipped this question.

Question seven asked the respondents if there is a years of service requirement before

being allowed to attend the officer development program. Forty-three respondents (55.1%) have

no years of service requirement. Two respondents (2.6%) have less than a year and four (5.1%)

have a time in service requirement of 1-2 years. Twelve (15.4%) have 2-3 years. The 3-5 years

of service category had thirteen respondents (16.7%). The remaining four respondents (5.1%)

have a 5-6 years requirement before taking the officer development program. Forty-eight respondents did not answer this question. The Charlotte Fire Department has a minimum of five years of service requirement before a member may apply to attend the officer candidate course (Charlotte Fire Department, 2009)

   Question eight was a follow-up to question seven and asked if the respondents felt that there should be a year of service requirement or that personnel should only take the officer development course when they were eligible for promotion or just after they are promoted to an officer position. Thirty of the respondents (37%), the majority, and indicated that a person should be able to take the officer development course at any time. Twenty-one of the respondents (25.9%) indicated that they feel there should be a years of service requirement while nineteen (23.5%) feel that a person should only take an officer development course when they are eligible for promotion. Six respondents (7.4%) feel that a person should take an officer development course just after promotion, as part of officer probation. Five respondents (6.2%) provided optional responses that included: a combination of education and time in-grade, start as soon as they are hired, and attend at any time after completion of a probationary period. Forty-five of the respondents did not answer this question.

   The final question on the external questionnaire asked the respondents to indicate their current rank. Thirty-three respondents (26.4%) were company officers, twenty-one (16.8%) were the Chief of their departments. Twenty (16%) were Drivers, Operators, Engineers, or Fire Technicians. Sixteen (12.8%) were Battalion or District Chiefs. Thirteen respondents (10.4%) were Deputy Chiefs and Twelve (9.6%) were Firefighters.   The remaining ten respondents (8%) were Assistant Chiefs. Only one respondent skipped the question.

Two of the municipal departments contacted by the author, the City of Raleigh and the Town of Chapel Hill fire departments; do not have an established officer development course. Raleigh has numerous time in-grade requirements for various ranks but does not have an established officer development program (J. Fanning, personal communication, March 24th, 2010). The Town of Chapel Hill Fire Department requires a minimum of four years of service as a Firefighter and the ability to meet the requirements set by the NC Fire and Rescue Commission for Fire Officer I for promotion (R. Bosworth, personal communication April 27th, 2010). According to Bosworth, additional requirements include knowledge and competency usually associated with the completion of one year of college courses of study related to the occupational field.

The third research question, "What knowledge retention/evaluation mechanisms exist for adult education that could be adopted or utilized by the fire service?" was used to direct the literature review in the educational psychology, organizational behavior, and adult education domains. Morrison, Ross, and Kemp (2001) recommend performing confirmative evaluations to determine a program's effectiveness over a period of time such as six, nine, or twelve months from the conclusion of the training program (Morrison, Ross, and Kemp, 2001 p. 276). The *Kirkpatrick Model*, also known as the *Four Levels*, was developed by Donald Kirkpatrick in 1959 (Kirkpatrick, 1998). The *Four Levels* offer an agency a sequence to evaluate a training program (Kirkpatrick, 1998, p.19). According to Egsegian (2001), the ADDIE model could also be used to evaluate an officer development program. Grant and Hoover (1994) and Cervero (1988) recommend that students are evaluated in addition to the training program.

The final research question asked "How have organizations outside of the fire service addressed the timing issue of management training?" Personal interviews were conducted with representatives from Bank of America, BAE Systems Inc., and the US Army.

Brian Fadden, Systems Engineering Consultant at Bank of America (BoA), stated that many of the managers he is familiar with were hired as management trainees after they graduated from college and began management training immediately after being hired (B. Fadden, personal communication, May 2nd ,2010). The US Army addresses the timing issue by providing leadership and management training to Officer Candidates during their basic training and upon completion of the training, the soldier begins applying the leadership and management abilities immediately (T. Hanlon, personal communication, April 5th, 2010). According to BAE Systems Inc. Precision Targeting Systems Chief Engineer Tim Mancillias, the timing issue is addressed slightly differently than the methods used by BoA and the US Army. BAE Systems assigns members of a work group to various leadership roles on a rotational basis, providing exposure to the varying critical tasks required for various management levels (T. Mancillias, personal communication, May 2nd, 2010).

Discussion

The problem addressed in this paper is that many members of the City of Durham (NC) Fire Department (DFD) who have completed the Officer Development Program do so as firefighters in their first two years of service. The assumption is that the amount of time which passes between the course completion date and the promotion to an officer position is too great; resulting in reduced performance levels and increased risk of personnel injury. Research question one asked "What is the correlation between when the officer development program was taken and how much of the presented information was retained at the time of promotion?"

The study results obtained from the internal questionnaire differ slightly from the findings of others discussed in the literature review.   The internal study indicated that only eighteen respondents thought that the time between completion of the officer development course and promotion was significant enough to cause a loss of retained information.

Custers (2008) and Pike (1989) both wrote that there is significant loss of knowledge retention depending on the retention interval. Custers reported that a person would be expected to experience slightly below fifty percent knowledge retention during the second year after a course (Custers, 2008, p. 123).

Muchinsky (2003), Leib (1991), and Chowdhury (2006) reported that the amount of information retained is directly related to the level of transfer of learning. Muchinsky (2003), Chowdhury (2006), and Egsegian (2001) concluded that in addition to the level of transfer, the amount of knowledge retention is also affected by the amount of practice or the ability to apply the information after the officer development course in a timely manner. Tyler (2000) wrote that training should be delivered relatively close to the time the training will be needed.

The author feels that the study results would have more closely mirrored the findings of the literature review had the internal questionnaire received more responses. A twenty-nine percent response rate is far lower than the author predicted and led to two significant issues. The low response rate made it difficult to establish that there is indeed a problem with the retention interval between the officer development course and being promoted. The second issue caused by the low response rate is that the questionnaire results indicate that only four respondents had 1-2 years of service and that eight had 2-3 years of service when they attended the officer development course. These two issues directly contradict the author's research problem

statement. The author believes that by reducing the retention interval, newly promoted officers

will retain more of the presented material.

The external questionnaire and personal interviews, as well as internet searches were

utilized to answer research question two: "How do similar departments address the timing

issue?" The external questionnaire results indicated that sixty percent of the respondents

belonged to departments that offered some form of an officer development program. Nearly half

of the respondents who attended an officer development program were promoted to an officer

position within 2 years of attending the course. The Richmond (VA) Fire Department addressed

the timing issue by sending all newly promoted officers to a two week course (B. Dalrymple,

personal communication, April 20th, 2010). Cline stated that once a member is promoted to

Captain, they attend a short one week refresher course to reinforce the important topics covered

in earlier training sessions (D. Cline, personal communication, April 27th, 2010). The results

show that many departments offer some form of an officer development program and that many

of these departments have addressed the timing issue by allowing members to attend the course

only after becoming eligible for promotion or immediately after being promoted. An implication

of these results for the Durham Fire Department would be that newly promoted officers would

have the officer development course with a shorter retention interval.

Research question three asked "What knowledge retention/evaluation mechanisms exist

for adult education that could be adopted or utilized by the fire service?" Cervero (1988),

Kirkpatrick (1998), and Martin, Ross, and Kemp (2001) wrote about the importance of

evaluating a training program, as well as providing some form of evaluation to gauge the transfer

of knowledge of the training participants. The literature review revealed that there are evaluation

models available that can be adopted by the fire service. Donald Kirkpatrick's *Four Levels*

(Kirkpatrick, 1998) and the ADDIE (Egsegian, 2001) are two examples of evaluation models that can be adapted by the fire service for program evaluation. Using the *Four Levels* model (Kirkpatrick, 1998), the author believes that the City of Durham Fire Department could develop a comprehensive evaluation tool to evaluate the knowledge retention of attendees of the officer development course. Evaluating the knowledge retention at the time of completion and again at the time of promotion would provide valuable data to the department to aid in reorganizing the officer development course if needed, and to aid in reducing the retention interval.

Research question four asked "How have organizations outside of the fire service addressed the timing issue of management training?" Bank of America (BoA), BAE Systems, Inc., and the US Army address management training in similar ways. BoA hires management candidates and sends them immediately to management training (B. Fadden, personal communication, May 2nd 2010). BAE Systems assigns project engineers to various leadership roles on a rotational basis so that they develop the necessary management skills related to their project (T. Mancillias, personal communication, May 2nd 2010). Master Sergeant Hanlon stated that the Army has two different leadership/management training based on the soldiers rank. Officers are trained in leadership/management as part of their basic training; the enlisted soldier attends leadership training as their rank requires (T. Hanlon, personal conversation, April 5th, 2010). BoA, BAE Systems Inc., and the US Army have a very short retention interval from training to assignment. The author believes that this shortened retention interval is a benefit to these companies; Muchinsky (2003), Egsegian (2001), and Tyler (2000) all wrote about the benefit of allowing an employee to apply newly acquired knowledge as soon as possible after the training. The author believes that the research supports the need to reduce the retention interval between attending the officer development course and being promoted.

Recommendations

The problem, as previously stated, is that many members of the City of Durham (NC) Fire Department (DFD) who have completed the Officer Development Program do so as firefighters in their first two years of service. The assumption is that the amount of time which passes between the course completion date and the promotion to an officer position is too great; resulting in reduced performance levels and increased risk of personnel injury. Based on the literature review and the results of the internal and external questionnaires, the following recommendations are suggested to the City of Durham Fire Department to reduce the time between the officer development class and being promoted to reduce the risk of injury and to increase performance levels:

1. Require a minimum of four years of service before a firefighter can attend the ODP. This recommendation will lessen the potential retention interval as well as allow the firefighter to concentrate on learning the job of a firefighter.

2. Using one of the models from the research, develop an officer development refresher course that is held immediately after promotion and concentrates on the most fundamental job requirements of the company officer such as report writing/reporting system and important human resources related policies.

3. Using one of the models from the research, develop and implement an evaluation mechanism to continuously evaluate the topics and effectiveness of the ODP administered to the student at the completion of the course and again at the time of promotion to officer.

In conclusion, this research project identified that the amount of time (retention interval) between attending the officer development course and being promoted can be significant enough

to cause a loss of knowledge retention. The author believes that by following these

recommendations, the City of Durham Fire Department can lessen the impact that the time

interval has on an officers ability to perform their duties, effectively and efficiently from the first

day of their assignment.

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Appendix A

EFO Executive Development ARP (Internal)

Q1. What is your current rank?

Answer Options	Response Percent	Response Count
Firefighter	16.5%	13
Technician	34.2%	27
Captain	36.7%	29
Battalion Chief	7.6%	6
Assistant Chief	3.8%	3
Deputy Chief	0.0%	0
Chief of Department	1.3%	1
	answered question	79
	skipped question	0

Q2. Have you completed the officer development course?

Answer Options	Response Percent	Response Count
Yes	73.4%	58
No	26.6%	21
	answered question	79
	skipped question	0

Q3. What rank did you hold when you took the officer development program?

Answer Options	Response Percent	Response Count
Firefighter	32.9%	26
Technician	31.6%	25
Captain	7.6%	6
Battalion Chief	1.3%	1
Assistant Chief	0.0%	0
Deputy Chief	0.0%	0
Chief of Department	0.0%	0
Have not completed officer development course	26.6%	21
	answered question	79
	skipped question	0

Q4. How many years of service did you have when you completed the officer development

program?

Answer Options	Response Percent	Response Count
<1 year	0.0%	0
1-2 years	5.1%	4
2-3 years	10.3%	8
3-4 years	11.5%	9
5-6 years	11.5%	9
>6 years	34.6%	27
Have not completed officer development course	26.9%	21
	answered question	78
	skipped question	1

Q5. If you have been promoted to Captain, how many years of service did you have when you were promoted to Captain?

Answer Options	Response Percent	Response Count
5-6 years	5.2%	4
6-7 years	2.6%	2
7-8 years	1.3%	1
8-9 years	11.7%	9
9-10 years	7.8%	6
>10 years	23.4%	18
Have not been promoted to Captain	48.1%	37
	answered question	77
	skipped question	2

Q6. The officer development course offered by Durham Fire Department adequately prepared me for the position of Captain.

Answer Options	Response Percent	Response Count
Strongly agree	2.6%	2
Somewhat agree	19.2%	15
Agree	7.7%	6
Somewhat disagree	19.2%	15
Strongly disagree	12.8%	10
Have not been promoted to Captain	38.5%	30
	answered question	78
	skipped question	1

Q7. The time period from completing the officer development course to the time I was

promoted to Captain was significant enough that I have forgotten, or otherwise am not readily familiar with, the knowledge and/or concepts that were delivered.

Answer Options	Response Percent	Response Count
Strongly agree	3.9%	3
Somewhat agree	10.5%	8
Agree	9.2%	7
Somewhat disagree	21.1%	16
Strongly disagree	6.6%	5
Have not yet been promoted to Captain	48.7%	37
	answered question	76
	skipped question	3

Q8. Were you given a post-course evaluation upon completion of the officer development course?

Answer Options	Response Percent	Response Count
Yes	29.2%	21
No	70.8%	51
	answered question	72
	skipped question	7

Appendix B

EFO Executive Development ARP (external)

Q1. Does your department offer an officer development program?

Answer Options	Response Percent	Response Count
Yes	60.3%	76
No (if NO, then please go to question 9)	39.7%	50
	answered question	126
	skipped question	0

Q2. Is the officer development program required for promotion to officer?

Answer Options	Response Percent	Response Count
Yes	49.4%	41
No	50.6%	42
	answered question	83
	skipped question	43

Q3. Have you completed an officer development program?

Answer Options	Response Percent	Response Count
Yes	63.9%	53
No	36.1%	30
	answered question	83
	skipped question	43

Q4. What rank did you hold when you completed the officer development program?

Answer Options	Response Percent	Response Count
Firefighter	8.9%	7
Driver / Operator / Engineer / Technician	24.1%	19
Company Officer	24.1%	19
Battalion Chief	3.8%	3
Assistant Chief	2.5%	2
Deputy Chief	1.3%	1
Chief of Department	1.3%	1
Have not attended course	34.2%	27
	answered question	79
	skipped question	47

Q5. What is the time difference of when you completed the officer development class and when you were promoted to officer?

Answer Options	Response Percent	Response Count
< 1 year	25.3%	20
1-2 years	24.1%	19
2-3 years	12.7%	10
3-5 years	0.0%	0
5-6 years	1.3%	1
> 6 years	1.3%	1
Have not attended course	35.4%	28
	answered question	79
	skipped question	47

Q6. Do you feel that this time difference had a negative impact on your ability to retain and implement the knowledge and skills obtained from the class?

Answer Options	Response Percent	Response Count
Strongly agree	5.1%	4
Somewhat agree	11.4%	9
Agree	3.8%	3
Somewhat disagree	21.5%	17
Strongly disagree	24.1%	19
Have not attended course	34.2%	27
	answered question	79
	skipped question	47

Q7. Is there a years of service requirement before you are permitted to attend the officer development program?

Answer Options	Response Percent	Response Count
< 1 year	2.6%	2
1-2 years	5.1%	4
2-3 years	15.4%	12
3-5 years	16.7%	13
5-6 years	5.1%	4
No years of service requirement	55.1%	43
	answered question	78
	skipped question	48

Q8. Do you feel that there should be a years of service requirement or that personnel should only take the officer development course when they are eligible for promotion or just after they are promoted to an officer position?

Answer Options	Response Percent	Response Count
Should be a years of service requirement	25.9%	21
Should only take when eligible for promotion	23.5%	19
Just after promotion, as part of officer probation	7.4%	6
Should be able to attend at any time	37.0%	30
Other	6.2%	5
Comments		7
	answered question	81
	skipped question	45

Q9. What is your current rank?

Answer Options	Response Percent	Response Count
Firefighter	9.6%	12
Driver / Operator / Engineer / Technician	16.0%	20
Company Officer	26.4%	33
Battalion Chief / District Chief	12.8%	16
Assistant Chief	8.0%	10
Deputy Chief	10.4%	13
Chief of Department	16.8%	21
	answered question	125
	skipped question	1

Q10. Please provide your department name and number of personnel.

Answer Options	Response Count
	113
answered question	113
skipped question	13

Appendix C

Fire Department Respondents to Questionnaires and Personal Interviews

Department	External Questionnaire	Personal Interview
Auburn Hills	x	
Bellevue, WA	x	
Boynton Beach, FL	x	
Carrboro Fire-Rescue, NC	x	
Cary FD, NC	x	x
Centerville-Osterville-Marston's Mill, MA	x	
Chapel Hill, NC	x	x
Charlotte Fire, NC		x
Chehalis, WA	x	
Chesterfield County, VA	x	
Citrus County	x	
City of Largo	x	
City of Raleigh	x	x
City of York, PA	x	
Clackamas	x	
Coppell FD	x	
County Fire Authority, Victoria, Australia	x	
El Dorado	x	
Fresno FD	x	
Ft. Lauderdale, FL	x	
Gilbert, AZ	x	
Golden FD, CO	x	
Goodyear FD	x	
High Point FD, NC		x
Kansas City, MO	x	
Leawood	x	
Middletown FD, CT	x	
Mill Valley	x	
NNFD	x	
Norfolk, MA	x	
Norfolk, VA	x	
North Kansas City	x	
O'Fallon	x	
Onalaska FD	x	
Pagosa Fire Protection District	x	

Prince William County, VA	x	
Richmond FD, VA		x
Ridge Road Fire District	x	
Salt River	x	
Sandusky	x	
Sandy Springs Fire-Rescue, GA	x	
Seminole County, FL	x	
Sioux City	x	
Virginia Beach	x	
Watertown FD	x	
West Allis, WI	x	
West Hartford	x	
Westminster FD, CO	x	
Wilson Fire-Rescue	x	

Appendix D

Personal Interview Questionnaire

1. How does (insert name of company/agency) hire personnel for management or leadership positions? Do you hire personnel specifically for management positions or are they selected from your general employee pool?

2. How are these personnel trained? Do they attend training immediately following being hired or is the training conducted over time?

3. Does (insert name of company/agency) have an internal management training program or do the employees receive training from an outside source?

4. When an employee finishes management training, what is the time interval until they begin applying the material from the training?